



The Moderating Effect of In-group Ostracism on Needs Threat: A gendered social identity increases effects of Cyberball-ostracism

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### ABSTRACT

Extant literature fails to converge on the possible moderating factors capable of enhancing or reducing the powerfully aversive experience of being ostracised. In particular, in-group-out-group distinctions have been shown in some studies to moderate ostracism-distress, while most report no moderating effect. Accordingly, the present study proposes that ostracism administered by a source group (female) that is central to a person's social identity, will be more impactful than ostracism administered by a source group that is not. In the present study, a sample of 81 university students (81 female) were included or ostracised by either an in-group (female) or out-group (male) ostracism source, on a between-subjects basis, while playing the game, Cyberball. Participants were required to report how they felt while playing Cyberball to determine mood affect, and perceived threat to fundamental needs (belonging, self-esteem, meaningful existence, and control), as well as providing a self-report indicating the importance of being a woman to their self-identity. Consistent with previous research, in-group ostracism moderated the level of mood and fundamental needs, that is; ostracism hurts more and social inclusion feels better when administered by in-group as opposed to out-group members. In a first point of difference, this effect was enhanced as a function of the extent to which the participant identified with the ostracism source. As a second point of difference, this effect was evidenced in the reflexive rather than reflective stage of a proposed temporal response of ostracism. These results are considered to make an important contribution to the ensuing debate for an inter-group vs. temporal perspective for ostracism response. Scope for future research is discussed, but recommendations for a between-subjects exploration of time (reflexive vs. reflective), as well as target gender (male vs. female), to explore possible extraneous variables is highlighted.

<b>KEY WORDS:</b>	<b>OSTRACISM</b>	<b>CYBERBALL</b>	<b>GENDER</b>	<b>CYBEROSTRACISM</b>	<b>GROUP MEMBERSHIP</b>	<b>SOCIAL IDENTITY</b>	<b>NEEDS THREAT SCALE</b>
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## INTRODUCTION

Over the past 15 years, research in ostracism has received considerable attention (Williams, 2001). In particular, studies in the psychology disciplines ethnology, socio-biology, and counselling have helped elucidate the impact of being excluded, with research in developmental and social psychology considered to be especially prolific (Williams, 2007; Ruggieri, Bendixen, Gabriel, & Alsaker, 2013). Concepts of rejection, group exclusion, silent treatment, ignoring, and the need to obey and conform, have all proven useful in broadening a general understanding of social exclusion. Yet, individually, they are concepts criticised for failing to encapsulate the complexity of what it means to be truly ostracised (Williams, 2001). Instead, Williams (2001) proffers ostracism as the salient manifestation of social exclusion informed by all of these individual psychological constructs.

Extant research supports social exclusion as a source of pain and distress, however ostracism is considered uniquely capable of simultaneously reducing mood and threatening four fundamental needs, *belonging*, *self-esteem*, *meaningful existence*, and *control* (van Beest & Williams, 2006). Research has also demonstrated that the immediate negative impact of ostracism is universal rather than distinct to face-to-face episodes (FTF: Williams & Sommer, 1997), or remote episodes, such as over mobile phones (Smith & Williams, 2004), Internet chat rooms (Williams, 2007), or during an online game of ball toss, known as **Cyberball** (Williams, Cheung, & Choi, 2000).

Cyberball is a virtual analogue to the ball-tossing paradigm (Williams, 1997), wherein participants receive the ball substantially less often (ostracism condition) than two ostensible players whom they do not know are actually computer avatars (Ruggieri et al., 2013). It has proven an appealing alternative to the time consuming methodology of training confederates, and a general summary of results indicates a significant negative effect for participants ostracised while playing Cyberball (Williams, 2007; van Beest & Williams, 2006). Indeed, Cyberball research has converged to support its utility in evoking 'ostracism-distress' routinely evidenced by self-reports using the Mood Scale (Gonsalkorale & Williams, 2007) and Needs Threat Scale (NTS: Jamieson, Harkins, and Williams, 2010), (Abrams, Weik, Thomas, Colbe, & Franklin, 2010; Ruggieri, et al., 2013; Sacco, Bernstein, Young, & Hugenberg; 2014; Williams 2001, 2007; Zwolinski, 2014).

In addition, the negative psychological impact of Cyberball ostracism has shown to be relatively insensitive to moderating effects, in particular group membership and the extent to which it may influence a person's response to exclusion from an in-group or an out-group (van Beest & Williams, 2006). However, a criticism made herein suggests Cyberball studies appear unduly focussed on benign group memberships which do not control for whether the participant identifies with the group in any meaningful way, for example the rather superfluous Mac vs. PC users (Williams et al., 2000) or indeed smokers vs. non-smokers (Williams et al., 2000). Furthermore, Cyberball studies reporting no moderating effect of gender on ostracism-distress, are argued as failing to acknowledge the meaningfulness of gender to a person's social identity, and instead make perfunctory biological distinctions between group sexes. For example, various study rationales that explore other dependent variables of Race (Sacco et al., 2014), Age (Abrams et al., 2011), or Political Group (Gonsalkorale & Williams, 2004), undoubtedly made more salient than gender.

Accordingly, the present study proposes that the relevance and salience of group membership to an individual will influence their response to being ostracised in the Cyberball paradigm. Informed by Social Identity Theory (SIT; Tajfel, 1982), group membership will be accepted as being central to an individual's sense of self, and that the self-concept is a manifestation of personal attributes combined with perceptions of social identity, within which gender is broadly recognised (Eagly & Chvrvala, 1986). To that end, the domain of gender will be manipulated at the source of ostracism, while target gender will be controlled (female) to investigate threatened needs across in-group (female) and out-group (male) conditions. In addition, the extent to which gender is important to a participant's self-identity, such that it will interact with the effects of ostracism, will also be assessed. It is expected that consistent with previous research there will be a negative effect of ostracism on levels of mood and fundamental needs, belonging, self-esteem, meaningful existence, and control. It is also expected that ostracism by in-group (female) will elicit the greatest negative effect, exacerbated by the extent to which the ostracism target identifies with the in-group (gender identity). Finally, a point of difference in the experimental design is that measures will be taken in the reflexive (immediately after ostracism episode) rather than in the reflective stage (>3 minutes after).

## LITERATURE REVIEW

### Ostracism: A Definition

In spite of the numerous studies dedicated to investigating the impact of social exclusion, rejection, and ostracism, it remains unclear whether these terms are interchangeable or are separate phenomena (Leary, 2005). Indeed, Leary (2005) suggests virtually no empirical research has successfully delineated any semantic or psychological distinctions. To that end, and in light of the present study design being contingent to the Cyberball paradigm testing ostracism, the definition used by Williams (2007) will be used. This describes ostracism as being “*ignored or excluded*” and often “*occurs without excessive explanation or explicit negative attention*” (p. 429). Furthermore, research operationalising ostracism generally agrees it is a process “*characterised as an unfolding sequence of responses endured while being ignored or excluded*” (Williams, 2007, p. 429).

### The Need to Belong: An evolutionary perspective

Human beings are motivated by a fundamental need to belong, and a preparedness to form relationships is considered largely innate (Baumeister & Leary, 1995). As argued by Gruter & Masters (1986), historically, reproductive opportunities and overall security increased when group cohesiveness was achieved as a function of ostracising deviant members; who subsequently died. Consequently, and as a means of ensuring survival, humans are thought to have evolved to detect even the slightest threat to the social self. Supported by research using fMRI scanners, ostracism has been shown to increase activation in the dorsal anterior cingulate cortex (dACC), the same part of the brain activated by physical pain. Accordingly, sensitivity to ostracism is described as an automatic response registered in a “*human detection system*” (Eisenberger & Lieberman, & Williams, 2003, p. 332), which is associated with a range of distressing emotional, cognitive, behavioural, biological, and neural responses if triggered (van Beest & Williams, 2006). Importantly, a triggered ostracism response is interpreted as a distress alarm. This is proposed to motivate a person to focus on the source of ostracism in order to apply the most appropriate coping or recovery response, to not only feel better, but to also maximise inclusion into the same ostracising group or another group altogether (Williams, 2001, 2007).

### Ostracism: Uses

While likely an evolutionary adaption, individuals continue to use ostracism today (Williams, 2007). Research consistently reports people demonstrate a greater willingness to comply, change behaviour, and generally become socially pliable in order to avoid being ostracised, and to enhance the prospect of inclusion after exclusion (van Beest & Williams, 2006; Williams et al., 2000; Williams & Sommer, 1997). Indeed, using ostracism to maintain group cohesiveness and group success has been demonstrated in political, religious, and other formal and informal groups, for centuries (Williams, 2007). The interrelated interpersonally aversive phenomena of a person's need to belong, and what happens when they are ostracised, is a powerful strategy woven into the social fabric to provide strength and resilience to social groups (Baumeister & Leary, 1995). Whether it is amassing votes through threat of political ‘exile’ (Gruter & Masters, 1986); protecting religious ideology from maligned beliefs through threat of ‘excommunication’ (Zipplelius, 1986); or even forcing compliance in a prisoner through threat of ‘solitary confinement’ (Williams, 2007), using ostracism as psychological

punishment is often regarded in the literature as a “*powerful and universal process*” (Williams, 2007, p. 3).

### **Ostracism: Outcomes**

Despite its apparent pervasive influence in social groups, ostracism was largely ignored by the media and social psychologists up until a recent surge in interest (Williams, 2007). One explanation for the impetus in reporting and empirical substantiation over the past 15 years is proposed to be the social pique and growing awareness of a possible association between social isolation and maladapted behaviours and psychopathologies. For children, this has been indicated as poor academic achievement, impaired development, depression, self-harming, and suicide ideology (Abrams et al., 2011; Williams, 2007). While for adults, social exclusion is associated with impaired work performance, unemployment, anxiety and depression (Zwolinski, 2014).

Perhaps, most alarming, is the growing body of evidence indicating more serious externalised behaviours carried out in response to social rejection (Anderson, 2001). Acting out, abusive language, and destruction of property are argued to be behaviours aimed at garnering the attention of the ostracising individual or group. While such behaviours will undoubtedly result in negative attention for the ostracism target, it seems any attention is better than no attention at all; such is the human need to belong (Anderson, 2001, Baumeister & Leary, 1995). Targets of ostracism may also resort to expressing anger, frustration, and aggression towards those unrelated to the original ostracism episode (Warburton, Williams, & Cairns, 2006). This link between ostracism and violence is considered so strong that under certain conditions concern for social acceptance, self-preservation, self-regulation, and fear of punishment, is eradicated (Williams, 2007). Consequently, social exclusion has been implicated in 87% of international school shootings (since 1985; Leary, Kowalski, Smith, & Phillips, 2003), in several cases of workplace violence (Waters, Lynn, & Morgan, 2002), as well as increasing an individual's vulnerability to radicalisation from extremist organisations (Ayden, Fischer, & Frey, 2010; James, 2003. As cited in Williams, 2007). In a television interview, Political Scientist, Paul James (2003) reported the consistent profile of Australians joining Al Qaeda was of a person feeling “*isolated, marginalised and excluded from their society*” (Williams, 2007, p. 427).

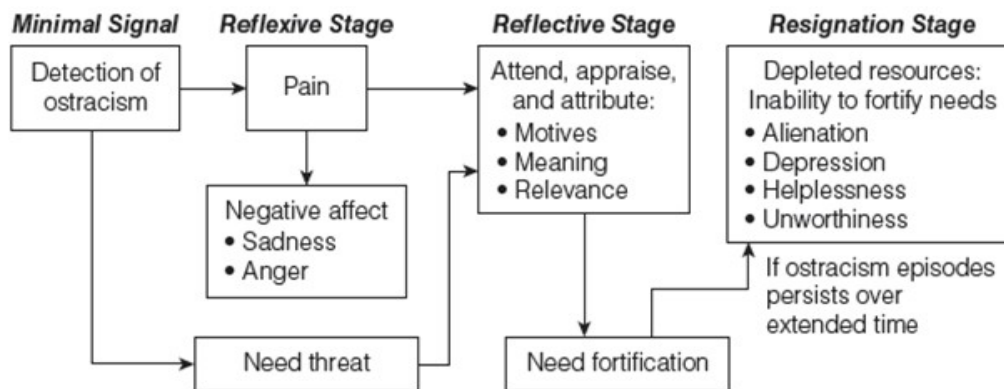
### **Ostracism Empirical Investigation: A Temporal Need Threat Model**

Prior to the 1990's, scientific studies focussing on social exclusion were scant (Williams, 2007). Subsequent research culminated in an agreed taxonomy explicating ostracism by *type*, *mode* and *motive* (see Appendix 1, for full description of the original Needs threat Model; Williams, 1997). An ensuing Zeitgeist asserted a need-threat notion, which suggested ostracism is capable of simultaneously threatening four basic, yet fundamental, human needs: - A sense of belonging, a positive self-esteem, meaningful existence, and a sense of control; ubiquitous across cultures, and generally processed within a *temporal framework* (Abrams, et al., 2011; Sacco et al., 2014; Williams & Zadro, 1995; Williams, 2007; 2009; Zwolinski, 2014).

### **Temporal Needs Threat Model**

The Temporal Needs Threat Model (TNT. Williams, 2009) emerged to describe and predict the processes, responses and reactions to ostracism depending upon the time lapsed since the ostracising episode. Central to the TNT model is the simultaneous

threatening of the four fundamental needs (belonging, self-esteem, meaningful existence, control), demarcated by three stages (*reflexive*, *reflective*, and *resignation*) contingent to the immediate, short-term, and long-term measures of responses to ostracisms (see Figure 1) (Abrams, et al., 2011; Williams, 2007; 2009; Zvolinski, 2014).



**Figure 1.** The Temporal Need Threat Model (Williams, 2009). This figure illustrates the stages of response following an ostracism episode.

The **reflexive stage** (first stage) refers to an ostracised target's immediate distress response theorised as being socially painful, threatening, and easily detectable due to an evolutionary over-sensitivity to cues of ostracism. As a reflexive, pre-cognitive response, it is argued to be immune to mitigating situational and individual factors, and provides little room for coping. Reflexive responses include emotional reactions (reduced mood), as well as lowered levels of fundamental needs (Williams, 2001, 2007). The **reflective stage** (second stage) occurs a few minutes after ostracism and refers to the coping and recovery strategies employed by the individual to improve mood and to fortify threatened needs. Research indicates coping responses in the reflective stage vary widely between *fight*, *flight*, and *freezing* (Twenge, Baumeister, Tice, & Stuke, 2005), as well as being the stage most vulnerable to moderating situational and individual factors (Williams, 2007). The **resignation stage** occurs after chronic ostracism whereby an individual has accepted that using coping strategies is futile in ameliorating the negative effects of ostracism. Subsequently, rather than attempting to improve their mood or fortify threatened needs, they accept them as lost (Williams, 2009).

Crucially, minor as well as more serious maladapted outcomes of ostracism have been aligned with the TNT (Williams, 2009) model. For example, withdrawal from, or abusive behaviours directed at, the ostracising source, is akin to a flight or fight coping response in the reflective stage. While more pervasive psychopathologies, such as depression, anxiety or extreme violence, are most likely to occur in the resignation stage when attempts to fortify fundamental needs are given up (Wesselmann & Williams, 2013; Williams & Zadro, 2005, Williams, 2007). It is therefore unsurprising social psychologists have been working to disentangle the possible mechanism underpinning responses to ostracism. Subsequently, as an adjunct to research exploring ostracism in social settings, is a focus on ostracism in cyber-communities, with preliminary results indicating cyber-ostracism is as harmful as face-to-face episodes (Williams, et al., 2000).

### Cyber-ostracism: A definition

The ability to interact via the computer and other electronic mediums has provided a positive and convenient way to conduct business, communicate with friends and family, as well as meet new people (Walthers, 1992). The widespread promotion and popularity of the Internet has seen vast international accessibility allowing people to connect whenever and wherever they are. Such advances in technology are considered mostly positive, however research indicates the Internet also provides a platform for harmful exchanges (Young & Nebuco de Abreu, 2010). Subsequently, growing concerns about traditional bullying traversing face-to-face interactions to instead occur online, espoused extensive research dedicated to investigating the implications of online bullying, known as cyber-bullying (Young et al., 2010). However, unlike the explicit nature of most cyber-bullying techniques, i.e. threatening texts, abusive emails, or broadcasting defamatory pictures or videos (Lawrence, 2015), cyber-ostracism is unique for its less overt mechanics of ignoring a person, i.e. not returning text or email messages, ignoring social media invites, or exclusion from multiplayer online role playing games; all considered simple but powerful tactics (Kassner, Wesselmann, Law & Williams, 2012; Williams et al., 2000; Young et al., 2010). Therefore, in response to the need to investigate ostracism and online interactions in an efficient and minimally traumatic manner, but which also aligned with face-to-face paradigms already in use, Williams and colleagues (2000) developed Cyberball – an online ball tossing game.

### **Cyber/Ostracism Manipulation: A Cyberball Paradigm**

Like face-to-face ostracism paradigms before it (see Williams, 1997, for full description of the FTF ball-tossing paradigm) the Cyberball paradigm relies on the source-target interaction occurring ostensibly outside of the experiment. However, rather than using confederates in an emergent game of ball-tossing, participants are told a ruse story informing them they will be playing a computer game to assess effects of mental visualisation. Specifically, participants are prepared to play a game with two other people connected over the Internet, when in reality they play Cyberball with two computer avatars. Ostracised participants receive the ball for the first three rounds before being ignored for the remainder of the game. Meanwhile, included participants are repeatedly included in the ball tosses and receive the ball as often as the other players (Williams & Jarvis, 2006)

A summary of results for experiments using Cyberball indicates consistent self-reports of reduced mood (feeling sad, rejected and angry) and a reduced sense of belonging, self-esteem, meaningful existence, and control. The typical effect size is quite large, Cohen's *d*'s in the 1.0 to 2.0 range (Ruggieri, et al., 2013; Williams & Zandro, 2005; Williams, 2007), and is argued to generalise across structural aspects of the Cyberball paradigm, including the number of players, game duration, and number of ball tosses.

Such is the utility of Cyberball ostracism in eliciting distress, even when a person's appraisals of the threat of ostracism could reasonably be expected to be effected by situational manipulations, distress was not minimised. For example, participants still reported lowered mood and threatened needs even when they knew they were playing a computer programme specifically designed to exclude them (Zadro et al., 2004), or that other players were acting to a script and not on their own volition (Eisenberger et al., 2003). Furthermore, like face-to-face paradigms, ostracism-distress also emerged in Cyberball studies regardless of manipulations to individual variables, which seem intuitively relevant. For example, moderating effects of introversion-extraversion (face-to-face; Nadasi, 1992), trait self-esteem (face-to-face; Leary, Haupt, Strausser, &



Chokel, 1998), or social anxiety (Cyberball; Zadro, Boland, & Richardson 2006) were not supported, despite predictions for a protective buffer or enhanced vulnerability to the negative effects of ostracism (Williams, 2007).

Interestingly, even as the importance of social in-groups intimates differences in levels of ostracism-distress, prior work has found lower mood and threatened needs regardless of the in-group-out-group status of the ostracising party (Williams 2007). For example, whether manipulating group membership by smoker vs. non-smoker (Smith and Williams, 2004), or delineating Mac from PS users (Williams et al, 2000), ostracism was reported to be equally distressing. Furthermore, and rather surprisingly, even when participants were ostracised by a despised out-group (members of KKK) they experienced lower mood and threatened needs as acutely as if perpetrated by a valued in-group (favoured political affiliation; Gonsalkorale & Williams, 2007). However, in stark contrast, more recent research indicates ostracism is sensitive to in-group moderation (Bernstein, Sacco, Young, Hugenberg, 2010), underpinned by an overarching covenant that a person's sense of self is intricately tied to the group/s to which they belong (Tajfel, 1982).

### **Ostracism: In-group-Out-group distinctions**

*Self-identity Theory (Tajfel, 1982):* Social groups are considered to be an important source of self-esteem, friendship, support and security (Correl & Park, 2005). Specifically, the pioneering Self-Identity Theory (SIT; Tajfel, 1982) proposes that group membership is central to a person's self-concept, and that the self-concept is contingent to the salience of the social identity activated by the meaningful characteristic shared with a group. SIT (Tajfel, 1982) also introduces a way of discriminating an in-group ("us") from an out-group ("them"), to explain intergroup behaviours, which tend towards in-group bias relative to out-group prejudice (Tajfel & Turner, 1986)

Consistent with the importance of social in-groups, research has indicated ostracism is more painful, and inclusion more satisfying when perpetrated by an in-group (Bernstein, et al., 2010). For example, Bernstein and colleagues (2010) found participants ostracised by racial in-group experienced lower mood and threatened needs compared to those ostracised by racial out-group, and increased mood and more satisfied needs when included by racial in-group compared to racial out-group. Their second study replicated these findings, however participants were ostracised or included by political in-group or political out-group. While supporting the moderating effect of group membership, both studies contrast with the previous work of Williams and colleagues (Mac vs. PC users, 2010), Smith and Williams (Smokers vs. Non-smokers, 2004), and Gonsalkorale and Williams (KKK members vs. favoured political affiliation, 2007).

One explanation for the controvertible results, is argued herein to be, the differences in experimental design, underpinned by inconsistent study aims influenced or not by the temporal model of ostracism response. That is, over-attendance by earlier ostracism researchers to explore possible nuances within the Temporal Needs Threat Model (Williams, 2009) supplanted the importance of social identity salience to strong group-based bonds. For example, Mac vs. PC user (Williams et al., 2000) or Smoker vs. Non-smoker (Smith & Williams, 2004) fail to account for the participant's perceived meaningfulness of the group to which they are assigned; a central construct of social-identity theory (Tajfel & Turner, 1986). Nor do they robustly control for one activated salient social identity, and instead conflate group membership to cross-cutting variables.

To elaborate, if a type of computer is of little consequence to the participant, a strong salient social identity is unlikely; instead, the participant is more likely to emphasise other characteristics shared with the ostracising source (peer, age, male, or female). Similarly, participants in the 'smoking' rather than 'non-smoking' in-group may reject emphasising the shared characteristic of smoking if they are attempting to quit, or feel guilty for having a habit most likely known to be harmful. Indeed, it could reasonably be argued participants may actually identify with the ostensible out-group (non-smoker). Certainly, Bernstein and colleagues (2010) findings support this assertion, whereby in-group ostracism moderated distress most likely because of the more meaningful social groups of race and political affiliation. However, rather frustratingly, their studies measured levels of mood and fundamental needs in the reflective rather than reflexive stage (as employed by Williams and colleagues). Consequently, it is unclear whether the meaningfulness of the in-group characteristics was integral to the moderating effect of ostracism-distress, or if it was the time lapsed from the ostracism-episode before measures were taken (reflexive vs. reflective stages).

Indeed, true comparisons for the moderating effect of in-group ostracism are difficult to make when the ensuing controversy is confounded by differences in the time ostracism-distress is measured. Accordingly, it is proposed in the present study; a methodology, which controls for the meaningful characteristics of the in-group (to ensure a salient social-identity) also measured in the reflexive stage, will provide a more consequential contribution to the literature. To that end, the in-group-out-group distinction of the important social group, *gender* (female vs. male; Eagly & Chivala, 1986) has been deliberately selected as a possible influencing variable of ostracism-distress. The possible extraneous variable of peer group (vs. total stranger) will be controlled by ensuring all participants believe they are playing Cyberball with 'somebody from their university', however, because all players will be anonymous, they will not actually know the players. It is anticipated emphasising 'gender', as the only identifying feature of the ostracism-source, will best serve the activation of one salient social identity (being female), and avoid confounds of cross-cutting variables. Furthermore, levels of mood and fundamental needs, as an effect of meaningful in-group ostracism, will be measured in the reflexive stage to juxtapose Williams and colleagues (2000) and Bernstein and Colleagues (2010) experimental designs.

## Gender

**Social Role Theory:** Central to Social Role Theory (SRT; Eagly & Chivala, 1986) is a focus on gender roles, generally defined as *homemaker* and *economic provider*. A homemaker is viewed as having communal characteristics of being kind, considerate, nurturant, caring and helpful. Meanwhile, an economic provider is considered to have agentic characteristics of being competent, assertive, independent, and with leadership qualities (Blakemore, Berenbaum, & Liben, 2012). It is generally accepted that character attributes of men and women are aligned with the social roles of homemaker and provider, indeed; research indicates it is often an expectation that they differ by these gendered characteristics such that they are now commonly held stereotypes (Eagly & Steffen, 1984).

Additionally, gender roles are argued to be intricately tied with notions of status and power, with women holding a lower status than men (Eagly & Steffen, 1984, 1986; Steffen & Eagly, 1985). Importantly, stereotypical expectations about characteristics and behaviours for men and women are based on the social powers available to each

sex. Described as *expectancy confirmation*, it contends that women acknowledge their own lack of power and display differential and nurturant behaviours to ensure others appraise them positively. Meanwhile, men are assertive and independent because they have power and expect others to respond positively when they behave this way (Eagly & Steffen, 1984, 1986).

Finally, Eagly and Karua (2002) posit expected behaviours associated with gender roles differ; for women these behaviours are primarily to seek close and intimate relationships (communal qualities), while for men, prestige and power is desired (agency qualities). Operating at a subtle level, these processes influence a person's expectations for their own behaviour as well as expectations for the behaviours of others. Crucially, incongruence between gender roles and expected behaviours leads to intrapersonal and interpersonal consequences (Eagly & Karau, 2002).

Accordingly, it seems reasonable that Cyberball-ostracism studies could predict a moderating effect of gender on ostracism-distress. Whereby, females would experience ostracism-distress more acutely if perpetrated by other females, not only as a basic in-group distinction, but specifically because of the stereotypes and expected behaviours of, and for, females within groups. That is, ostracism would breach expected nurturing and caring behaviours, as well as being especially threatening to the communal qualities for women who seek close and intimate relationships. However, research does not support this rationale. Instead, it is consistently reported that no moderating effect occurs, and men and women are equally affected by ostracism (Abrams et al., 2011; Sebastian, Viding, Blakemore, & Williams, 2010; Williams & Sommer, 1997). While strictly an accurate interpretation of results, closer inspection of experimental design reveals confounds ubiquitous to all studies. Ranging from a focus on cross-cutting variables (Abrams et al., 2011; Sacco et al., 2014), uncontrolled gender ostracism-source (Bernstein et al., 2010), and sample effects (Abrams et al., 2011); it culminates to minimise the robustness of widespread reports of no moderating effect of 'sex'. For example, in one of the very few published studies to date that manipulates the source of ostracism by gender, Abrams and colleague's (2011) investigate differences in ostracism-distress response, however Age (not gender) is the moderating variable examined in a sample of children, adolescents and adults; 68 males and 98 females. Subsequently, they emphasise 'peer group', and only incorporate gender information "unobtrusively" (p. 114) such that the gender of the other players may or may not be acknowledged by the participant. It is an approach argued herein as breaching theoretical underpinnings for the need of a salient social identity to elicit meaningful group membership in order to robustly explore any moderating in-group-out-group distinctions on ostracism-distress. Furthermore, the unequal distribution of males and females across study groups in Abrams and colleague's (2011) study almost certainly reduces the power for any sex effect reported. Regardless, they report no moderating effect of gender.

Similarly, studies investigating in-group and out-group effects of ostracism where race of excluder (Sebastian et al., 2010), time since ostracism (Zwolinski, 2014), or political party (Gonsalkorale & Williams, 2007) are the moderating variables, also conflate results to include no moderating effect of sex even though they do not have gender as central to the participant's social identity. Subsequently, reporting no sex effects of ostracism while exploring other salient variables is accurate insofar as ostracism-distress is the same for men and women (boys and girls), but only as a biological distinction and not

as an exploration of the moderating effect of gender – a far more complex social construct.

## **PRESENT STUDY AIMS**

The present study aims to contribute to the abundance of research indicating Cyberball-ostracism (ostracism condition) lowers mood and threatens fundamental needs, belonging, self-esteem, meaningful existence, and control, compared to experiences of inclusion (inclusion condition). Importantly, it is also anticipated to provide a unique perspective of an individual's response to ostracism when the source of ostracism is central to the targets own gender. Based on well-documented theories of social identity and social roles, it is accepted females and males are separable by social role stereotypes, which asserts females as nurturing and caring, as well as motivated by communal qualities to form close and intimate relationships. Accordingly, ostracism-distress is expected to be effected by in-group (female) and out-group (male) status – such that ostracism will hurt more when perpetrated by an in-group (females) compared to an out-group (males), and inclusion will feel more positive when offered by an in-group (females) compared to an out-group (males). Furthermore, the extent to which an individual self-identifies (gender identity) with the in-group (females) will be examined, with expectations that aversive responses will be exacerbated by the level of identification (high vs. moderate) with the in-group.

Four hypotheses will be tested.

**H<sub>1</sub>:** Ostracised participants will report lower mood from pre- to post- test compared to included participants.

**H<sub>2</sub>:** Ostracised participants (ostracism-condition: ostracised) will report lower levels of Needs Satisfaction and Fundamental Needs, belonging, self-esteem, meaningful existence, and control, compared to included participants (ostracism-condition: included), post test

**H<sub>3</sub>:** Participants ostracised by in-group (source-gender: female) will report lower levels of Needs Satisfaction and Fundamental Needs, belonging, self-esteem, meaningful existence, and control, than participants ostracised by out-group (source-gender: male), post-test

**H<sub>4</sub>:** Participants ostracised by in-group (source-gender: female) will have lower levels of Needs Satisfaction and Fundamental Needs, belonging, self-esteem, meaningful existence, and control, influenced by the extent to which they identify (target gender-identity) with the in-group (source-gender: female).

### **Important note: Measures of fundamental needs.**

Research does not converge for measures of fundamental needs, belonging, self-esteem, meaningful existence, and control. Williams & Zadro (2005) posit no compelling reason to separate individual measures due the consistently high levels of inter-correlation between belonging, self-esteem, meaningful existence and control, and instead use a composite score reported as *Needs Satisfaction*. Conversely, widely published reports support a more nuanced picture of Cyberball-induced ostracism derived from measuring each of the four fundamental needs independently rather than using a composite score (Abrams et al., 2014; Ruggieri, Bendixen, Gabriel, & Alsaker, 2013; Zadro et al., 2004). Accordingly, as a pragmatic adjunct to the main aims of the present study, measures of Need Satisfaction (composite score) as well as Fundamental needs (as individual measures) will be analysed, reported and discussed.

## METHOD

### Design

To test for the effect of ostracism on Mood, Needs Satisfaction (composite score), and Fundamental needs (individual measures of belonging, self-esteem, meaningful existence, and control), a quasi-experiment was carried out on a sample group of 81 ( $N = 81$ ) females.

**Mood:** To test for the effect of ostracism on mood (DV: mood score) a between-subjects, t-test of ostracism condition (IV: included vs. ostracised) was conducted to provide a mood level baseline between the two groups.

To test for the effect of ostracism on mood before and after playing Cyberball, two ANOVA's were conducted. The first was a two-factor, within-subjects ANOVA with mood (DV: mood score), as the repeated measures variable. Main effect of time (IV: pre vs. post) and ostracism condition (IV: included vs. ostracised) was tested. The second was a two-factor, between subjects ANOVA with mood (DV: mood score) as the repeated measures variable. Main effect, time (IV: pre and post) and main effect, ostracism condition (IV: included vs. ostracised) was tested; this was followed by a t-test for direction of effect.

**Needs Satisfaction and Fundamental Needs:** To test for the effect of ostracism-condition, source-gender, and target gender-identity on Needs Satisfaction and Fundamental Needs, several  $2 \times 2 \times 2$  between-subjects ANOVA's, distinct by these two dependent variables, were conducted on the sample group.

All analyses were selected as a three-factor analysis, with tests of main effect ostracism-condition (IV: included vs. ostracised); source-gender (IV: male vs. female); and target gender-identity (IV: moderate vs. high) on levels of Needs Satisfaction (1<sup>st</sup> DV: Needs Threat Scale - composite score) and Fundamental Needs (2<sup>nd</sup> DV: Needs Threat Scale - average score by individual need). The interaction of the three factors in their effect on the DV's was also assessed to explore a three-way interaction (ostracism\*source gender\*target gender identity).

### Participants

A total of 91 university undergraduates from the Psychology department at a UK university participated in the experimental phase of the study. However, final data analysis was conducted on 81 ( $N = 81$ ) participants, with 10 aberrant participants identified through manipulation checks, resulting in their data being excluded from the study. All 81 participants were female. Year of study was represented as 9.9% foundation year, 49.4% first year, 25.9% second year, 11.1% third year, and 3.7% postgraduate. The mean age for participants was 23.99 ( $SD = 6.56$ ), with a range from 18 to 46 years. Ethnicity was represented as 65.4% British, and 34.6%, Other (self-rated; 6.17% each Black British and Asian, 2.47% each Polish, Lithuanian, and Sri Lankan, 1.23% each Persian, Egyptian, Ghanaian, Irish, German, Iranian, and Zimbabwean). Participants were incentivised with 2 points awarded to their SONA<sup>1</sup> student account, as well as a chocolate or health bar.

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<sup>1</sup> SONA is a University based Research Participant Programme, whereby individual student accounts are credited with points specific to intra-university studies. Twenty cumulative points gained before the final year of study allows students to utilise SONA for their own research. This study was laboratory based and exceeded 15 minutes; therefore participants were awarded two points.

## Ethics and Recruitment

Approval from the university ethics board was received before data recruitment. Recruitment was an opportunity sample consisting of participants who responded to the study advertised online with SONA, as well as those approached at random on campus by the researcher. Written, informed consent was received by the participants before data collection (see Appendix 2). Data collection was carried out across two academic semesters, a Pearson chi-square test indicated there was no association between semester (first vs. second) and ostracism group (included vs. ostracised),  $\chi^2(1) = .38, p = .58, N = 81$ ; both conditions (included vs. ostracised) were equally represented in the first and second semester. All participants were informed of the study's aim to investigate the task of mental visualisation to assess performance in online games played with others. This deception is consistent with all research using the Cyberball paradigm (Williams & Jarvis, 2006).

## Randomisation

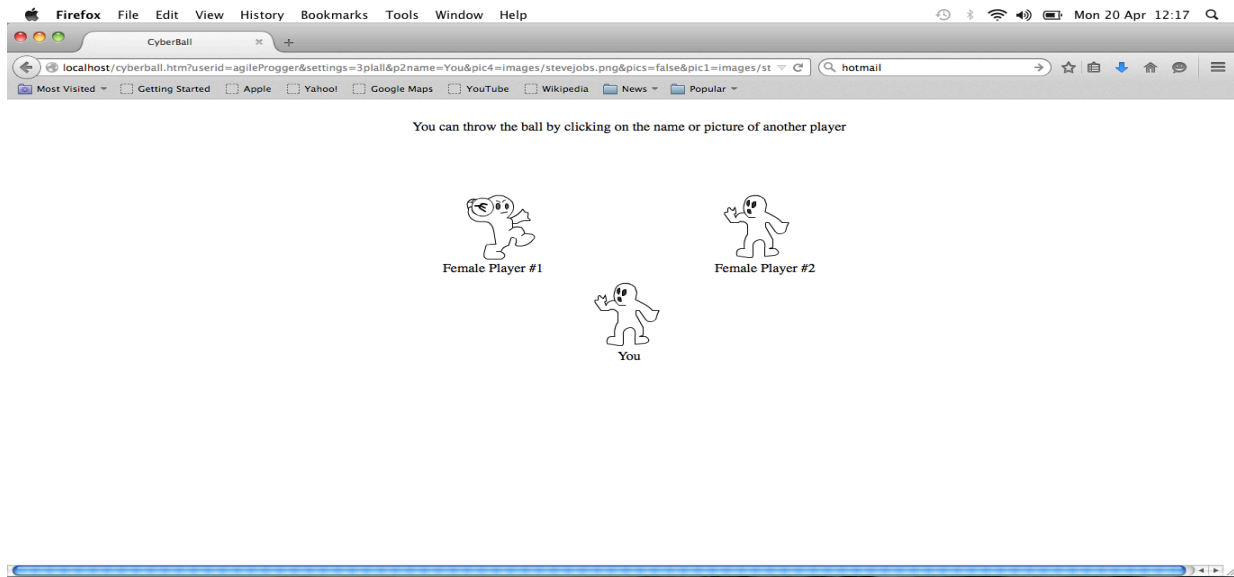
Participants were randomly assigned to one of four Cyberball conditions (25.93% Included: two females; 24.69%, Excluded: two females; 24.69%, Included: two males; or 24.68%, Excluded: two males).

## Materials

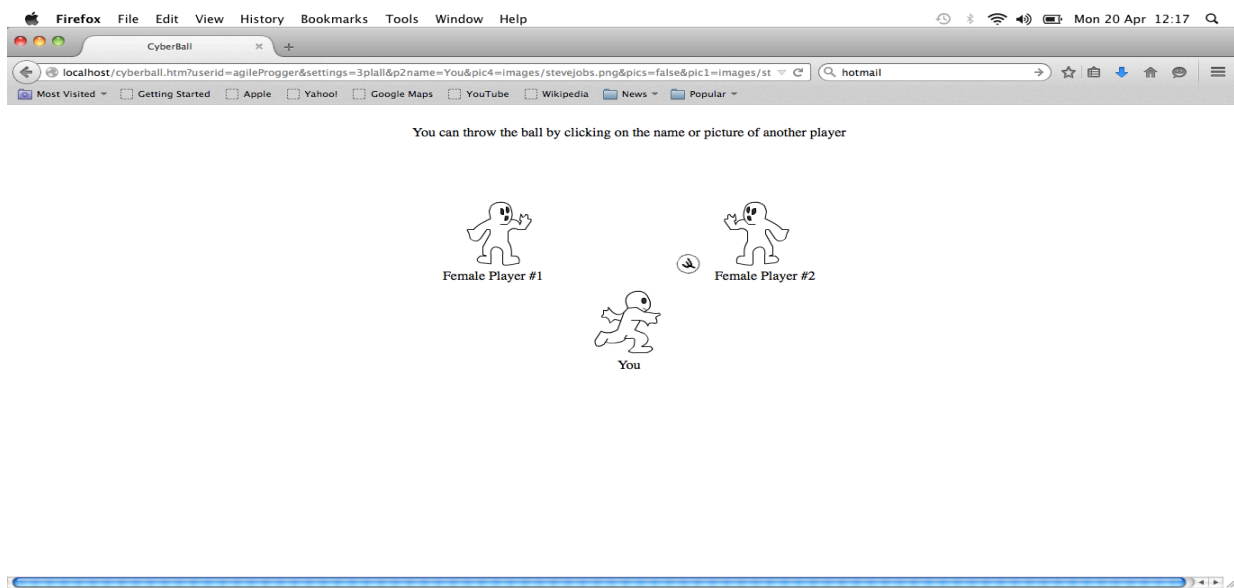
**Laboratory:** The university psychology department computer laboratory was used to legitimise the research design. Concealed windows ensured participant anonymity, and its location helped maximise perceptions of playing Cyberball with other university peers at the same time in nearby rooms.

**Cyberball 4.0:** Cyberball 4.0 (Williams et al., 2012) is an open-source computer programme freely downloaded to the researcher's own 13" Mac Air Laptop. Apache HTTP webserver was also downloaded from The Apache Software Foundation (<https://httpd.apache.org>, 2015) to allow the researcher to run Cyberball as a website, the recommended method. The researcher performed ostracism condition and source gender manipulations by changing Cyberball URL parameter templates, merging logs, and setting files as instructed for custom settings in the Cyberball user manual (<http://cyberball.wikispaces.com/file/view/User%20Manual%20for%20Cyberball%204.pdf/290382747/User%20Manual%20for%20Cyberball%204.pdf>, 2015) (see Appendix 3 for Cyberball screenshot of manipulations).

Ostracism condition was manipulated by pre-programming 'Group 1' to include the participant equally in all tosses of the ball; 33%, and 'Group 2' to include the participant equally in the first nine ball tosses (three turns), before excluding them for the remainder of the ball tosses. Gender salience was manipulated by changing the two Cyberball avatar names to read 'Female Player 1' and 'Female Player 2' (see *Image 1 and 2*) or 'Male Player 1' and 'Male Player 2'.



**Image 1.** Cyberball screenshot (Williams et al., 2001). This image illustrates the gender salience of the other players 'Female Player 1' and 'Female Player 2' and the participant denoted as 'You'. The participant is waiting to receive the ball.



**Image 2.** Cyberball screenshot (Williams et al., 2001). This image illustrates the participant 'You' throwing the ball to another player.

### Assessments: Dependent Variables

**Mood:** To measure mood, four bipolar mood items (good-bad, happy-sad, relaxed-tense, accepted-rejected) were answered on a 9-point rating scale ranging from 1 (*not at all*) to 9 (*extremely*); item 4 was reverse scored (see Appendix 4). Total score was taken from the sum value of all four items assessing mood, minimum score = 4 (low mood), maximum score = 36 (high mood).

The mood measure was a direct replication previously used by Gonsalkorale and Williams (2007) who report acceptable test-retest reliability. Further reliability analysis in this study indicates acceptable internal consistency; Cronbach's alpha,  $\alpha = .64$ .

**Needs Satisfaction:** Threatened needs were measured using the 'Needs Threat Scale' (NTS; Jamieson, Harkins, and Williams, 2010), amended in this study to include demographics Age, Year of Study, Ethnicity, Sexual Orientation, and Relationship Status (see Appendix 4). Consisting of 20 items, the NTS has both negative and positive statements that are designed to measure a person's need satisfaction based on the perceived threat to their four fundamental needs; belonging, self-esteem, meaningful existence, and control. For example, '*I felt disconnected*', '*I felt good about myself*', '*I felt invisible*' and '*I felt powerful*'. Responses were coded on a 5-point rating scale ranging from 1 (*not at all*) to 5 (*extremely*), whereby a low score indicates low need satisfaction. **NTS Scoring:** Cyberball-induced ostracism is reported to threaten all four fundamental needs simultaneously (Williams, 2009; Jamieson et al., 2010) Therefore, consistent with previous research, it was anticipated that individual needs-threat measures of belonging, self-esteem, meaningful existence, and control would be highly correlated with each other to allow for a single index, composite score (Williams, 2007) (see '*Results p31*' for study analysis).

**Fundamental Needs:** Separate measures of the four fundamental needs; belonging ( $\alpha = .72$ ) self-esteem ( $\alpha = .71$ ); meaningful existence ( $\alpha = .68$ ); and control ( $\alpha = .71$ ) were also assessed using the same participant responses to the NTS (Jamieson et al., 2010) scored as the average of five items answered per fundamental need.

**Gender identity:** To measure target gender identity, a brief, four-item scale modified from the importance subscale of the Collective Self-esteem Scale (Luhtanen & Crocker, 1992) was used. (see Appendix 4). Participants rated the following four items worded specifically to their gender (female) on a 5-point scale ranging from 1 (*strongly agree*) to 5 (*strongly disagree*): "Being a woman is an important part of my self-image," "Being a woman is unimportant to my sense of what kind of person I am," "Being a woman is an important reflection of who I am," and "Being a woman has very little to do with how I feel about myself". Items 2 and 4 were reversed scored. Consistent with previous research, responses were averaged to provide a reliable index of gender identification, Cronbach's alpha,  $\alpha = .70$ . However, in order to conduct an ANOVA for this study, target gender identity was converted from a continuous variable to a categorical variable by conducting a median-split on total values; sample median = 17. This was considered to be quite high, as well as contrary to a predicted 'median-split - low vs. high', gender identity dichotomy informed by previous research (Schmader, 2002). Subsequently, it was decided that scores 17+ would be labelled as *high* in gender identity, while scores of 16 and below would be labelled *moderate* in target gender identity.

## Procedure

Participants used SONA, or verbal confirmation if approached on campus, to pre-arrange a time to complete the study. Upon arrival at the laboratory, the researcher greeted them and immediately directed them towards a seat positioned at a desk in front of a computer screen. The computer screen had three tabs pre-loaded and open in



order of experimental design Tab1. Qualtrics<sup>2</sup>: Mood scale (pre-test), Tab 2. Cyberball game, and Tab 3. Qualtrics: Second Post Game Questionnaire, including measures Needs Threat Scale (items randomised), Mood and Gender identity scales (randomised between each other), 3. Demographics, and 4. Manipulation checks. Randomisation was pre-programmed by the researcher on Qualtrics to avoid participant order effect.

Participants were asked to turn off all mobile devices and remove any cumbersome clothing or bags. They were then provided with a participant study information sheet (see Appendix 5), which confirmed the study's approval by the university ethics board, the voluntary status of their participation, as well as the study aim, which was ostensibly to assess the task of mental visualisation on performance during an online game played with others. In reality, the participant would be playing Cyberball with two computer avatars pre-programmed to include or ostracise the participant in ball tosses. The researcher used a study script for consistency which entailed the participant being advised they would be playing the online game with two people from their university, however all players would remain anonymous. It was at this point source gender (pre-determined: two females or two males) was first made salient as the only identifying feature of the other two Cyberball players i.e. "Today you will be playing Cyberball with two other females (males) from the University of West London (UWL)".

The researcher then asked the participant to read and sign the consent form; meanwhile apologising for needing to text message two researchers in two separate rooms to confirm the participant had arrived. This was in fact a ruse and was done to make human rather than computer interaction more believable. The participant was then given a unique participant number, which corresponded with the ostracism condition they had been randomly assigned to. The participant's student identification number also corresponded with the unique participant number manually recorded in a tally of ostracism conditions used by the researcher to ensure even group samples.

The participant was then requested to complete the Mood scale online while the researcher pretended to appear busy sending a text message to the two other researchers, again a ruse. Once the participant had completed the Mood scale, the researcher demonstrated the features of Cyberball and talked them through the first webpage preamble standard to Cyberball, which included instructions for the 'mental visualisation' task (see Appendix 3 for full description). The participant was then invited to play a trial game wherein they were included equally in three rounds of ball tosses. Halfway through the trial, the researcher feigned receiving a text message confirming the other two players were ready to begin playing. The researcher then advised the participant to prepare to start playing Cyberball legitimately. To maximise source gender the participant was requested to use the computer mouse to select one option from two drop down menus, Menu 1. Groups – options: group 1 (included), or group 2 (excluded), and Menu 2. Sex –options: two females, two males, or mixed. Prior to pressing 'connect to start playing', the participant was verbally instructed to complete the second questionnaire located on the third tab immediately after finishing Cyberball. Similar onscreen instructions were programmed to appear at the end of playing Cyberball to ensure minimal lag between game completion and questionnaire commencement.

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<sup>2</sup> Qualtrics (2012) is a software application acting as an enterprise survey platform for academics to build up questionnaires specific to their research needs. Participant responses to questionnaires are recognizable data for SPSS analysis.

The researcher stayed to watch the participant complete the first round of ball tosses, before leaving the room. After a period of 4 minutes the researcher quietly re-entered the room and sat quietly at a desk, writing randomly on a notepad. Once the participant had completed the second questionnaire, the researcher joined them at their table to conduct the verbal manipulation check (human vs. computer interaction i.e. *“Did you believe you were playing a human or computer avatar?”*), before concluding with a full debrief.

### **Full Debrief**

Participants were advised verbally and in writing of the two separate but necessary areas of deceit, 1. The true hypotheses of the study, and 2. Playing Cyberball with computer avatars programmed to include or ostracise them in the ball tosses. They were also informed of Cyberball research indicating participants mood levels normally return to baseline levels within 10 minutes of playing; accelerated to only 3 minutes if another game of inclusion is played (Abrams et al., 2011). Therefore, participants in the ostracism condition were especially encouraged to play a second game of Cyberball wherein they could self-select the group and gender of players to reverse the expected effect on their mood levels. However, all participants declined the invitation to play another game. Participants were then offered a copy of the debrief form (see Appendix 6), as well as a chocolate or health bar. They were then asked to refrain from discussing the study with other students to avoid the true hypotheses being known and interfering with data. The participant was then reminded they could contact the researcher at any time to discuss the study or their data being used in the study. Once the participant had left the room the researcher awarded 2 SONA points to their student account online, and then manually observed the final manipulation check for source gender salience (see study *‘Source Manipulations, p. 29’*), confirming or deleting the participant’s data from final analyses.

### **Pilot**

A pilot study using four university colleagues of the researcher was carried out prior to data recruitment and collection. The participants were assigned to one of four Cyberball ostracism conditions.

### **Outcomes**

The first two participants indicated suspicion about the pre- and post- game questionnaires and their relationship with Cyberball. Subsequently, the researcher included the ruse of ‘two separate experiments running concurrently’ into the study script; successfully confirmed by the following two participants.

The first participant did not notice the onscreen instructions to commence the second questionnaire immediately after playing Cyberball, resulting in them sitting for nearly 3 minutes before notifying the researcher. Subsequently, the researcher included additional verbal instructions to the study script to limit lag between game completion and questionnaire response; successfully confirmed by the following three participants. An informal interview with the four pilot participants also confirmed they were not fatigued by the length of study, navigating across three tabs onscreen to complete the study was easy, and playing Cyberball was a very simple task achievable for even the most inexperienced computer user. Importantly, the researcher was able to rehearse the study script to ensure experimental consistency.

## RESULTS

### Manipulation Checks

Five manipulation checks were carried out to test the participants' perception of ostracism, source gender salience and university peer, perceived anonymity, and human vs. computer interaction while playing Cyberball.

#### *Ostracism Manipulation*

To assess **ostracism**, a paired sample t-test was conducted comparing the excluded and included subjects, taken from single item score (i.e., "I was included in the ball tosses") answered from a 5-point scale (1 = "Not at all", 5 = "Extremely"). Mean scores indicate included participants ( $M = 4.68$ ,  $SD = .47$ ) reported being extremely included in the ball tosses compared to excluded participants ( $M = 1.23$ ,  $SD = .47$ ) who did not feel they were included,  $t(79) = 34.73$ ,  $p < .001$ . This suggests participants correctly perceived being included or ostracised during the game.

#### *Source Manipulation*

To assess **source gender salience**, the researcher carried out a manual manipulation check directly after the study was complete. By cross-referencing the participant's Cyberball condition with their response to the item, "What was the gender of the people you were playing Cyberball with?" ('two females', 'two males', or 'one male and one female'), revealed two aberrant participants who thought they played the opposite gender of the condition they were assigned. Their data was not included in the analysis and the consecutive participant was assigned their Cyberball condition. All other participants correctly reported the source gender indicating salience.

To assess '**university peer**' a manipulation check revealed only 5% ( $N = 4$ ) of participants did not believe they were playing a university peer. Fishers test reveals no significant differences between groups,  $p = .241$ . All other players correctly reported they believed they were playing somebody from their university.

To assess **perceived anonymity** a manipulation check revealed only 2.5% ( $N = 2$ ) of participants thought they knew the person they were playing. Fishers test revealed no significant difference between groups,  $p = > .999$ . All other participants correctly reported not knowing the other players.

To assess **human interaction** a verbal manipulation was carried out after the study was completed prior to debriefing. Answering the question, "*Did you feel you were playing Cyberball with humans or computer avatars?*" ten players incorrectly identified playing with computer avatars. Their data was not included in the analysis and the following participant was assigned their Cyberball ostracism condition. All other players correctly reported playing humans.

### Analyses

**Mood:** To test for levels of mood for ostracised ( $N = 40$ ) or included ( $N = 41$ ) groups before and after playing Cyberball, various analyses were conducted.

**Mood Affect at Pre-test:** A t-test revealed levels of mood did not differ between ostracised ( $M = 28.06$ ) and included ( $M = 27.07$ ) groups before playing Cyberball,  $t(79)$

= -1.55,  $p = .126$ . Therefore, a baseline of mood affect was interpreted and accepted to support further analysis.

A Levene's test for homogeneity of variance was not significant  $F(1, 79) = 0.91$ ,  $p = .764$ , indicating variance was equal across both groups.

Analysis for normality indicated mood for ostracised compared to included groups was evenly distributed at pre-test.

**Mood Affect at Pre-test vs. Post-test:** To test for differences in mood levels before and after playing Cyberball, as well as between ostracised and included participants, two ANOVA's were carried out.

The first analysis was a 2 (Effect of Time: Pre vs. Post) x 2 (Ostracism: Included vs. Excluded) within-subjects ANOVA with mood as the repeated measures variable, revealing a main effect of time  $F(1, 79) = 11.39$ ,  $p < .001$ . This indicated mood levels differed before and after playing Cyberball.

A Levene's test indicated homogeneity for pre-test  $F(1, 79) = .091$ ,  $p = .764$ , but not post-test  $F(1, 79) = 5.68$ ,  $p = .02$ . However, corrections for '*equal variance not assumed*' was significant  $p < .001$ , and is accepted for homogeneity of variance across groups.

A second analysis used a 2 (Effect of time: Pre vs. Post test) x 2 (Ostracism: Included vs. Ostracised) between-subjects ANOVA to reveal a main effect of ostracism  $F(1, 79) = 38.10$ ,  $p < .001$ . Inspection of means indicated the included group had higher levels of mood  $M = 29.07$ ,  $SD = 3.45$ , than the excluded group  $M = 24.34$ ,  $SD = 3.45$ . A main effect of time was also indicated  $F(1, 79) = 11.40$ ,  $p = .001$ . Inspection of means indicated overall mood is lower after playing Cyberball  $M = 27.83$ ,  $SD = 14.49$  than before  $M = 25.64$ ,  $SD = 7.25$ . The interaction effect between time and ostracism was also significant  $F(1, 79) = 87.34$ ,  $p < .001$ . A follow up analysis for direction of effect included a t-test. Consistent with previous research, and as predicted, the excluded group had lower levels of mood after playing Cyberball  $M = 28.60$ ,  $SD = 4.65$  and  $M = 20.08$ ,  $SD = 5.37$ ,  $t(39) = 7.43$ ,  $p < .001$ , than the included group who had higher levels of mood after playing Cyberball,  $M = 27.07$ ,  $SD = 4.27$  and  $M = 31.07$ ,  $SD = 3.97$ ,  $t(40) = -5.65$ ,  $p < .001$ .

### **Self-reported Levels of Need Satisfaction and Fundamental Needs at Post-test**

**Need Satisfaction:** A reliability analysis was carried out using SPSS to assess the internal consistency of the Needs Threat Scale (Jamieson et al., 2010). As shown in Table 1, ostracism had a reliable effect on fundamental needs.

**Table 1.** Individual Fundamental Need Means and Standard Deviations informed by Ostracism condition.

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Need Satisfaction measure

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	<u>Belonging</u>		<u>Self-esteem</u>		<u>Meaningful Existence</u>		<u>Control</u>	
Condition	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Ostracised	8.47	3.35	11.40	2.85	9.47	3.20	9.28	3.09
Included	20.43	4.53	20.05	4.27	20.73	4.38	20.68	4.39

*Lower scores index more needs threat and less need satisfaction.*

Furthermore, significant correlations between each fundamental need were indicated (see Table 2). Subsequently, and in replication of other studies (Jamieson et al., 2010), the sum score of individual fundamental needs was averaged for each participant and added together to provide a reliable composite score reported as Needs Satisfaction, Cronbach's alpha =  $\alpha = .69$ ; used in the subsequent analyses.

**Table 2.** Individual fundamental needs inter-item correlation matrix

	Control	Self-esteem	Meaningful existence
Belonging	.88**	9.29**	9.18**
Control		1.00**	.89**
Self-esteem			1.00**

\*\* $p < .001$ .

### Normality of Distribution

Check of distribution showed a negative skew for included groups and positive skew for ostracised groups. This was assumed to have been forced by the study design whereby participants were randomised to an ostracised or included group, which was expected to decrease or increase levels of fundamental needs. The specific direction of the skewed distributions associated with the ostracised condition support this rationale. Log transformations carried out failed to correct for skewness and assumptions required for an ANCOVA remained violated. Subsequently, initial expectations of testing for a moderating effect of target gender identity as a covariate for the relationship between ostracism-condition and gender-source was not possible. To that end several ANOVA's and interactions of main effects were used.

### Univariate test for Main Effects

Hypothesis two predicted participants in the ostracism condition would report lower levels of Needs Satisfaction and Fundamental Needs, belonging, self-esteem, meaningful existence, and control than participants in the included-condition. Accordingly, mean levels of Need Satisfaction and Fundamental Needs were compared across ostracised and included groups. ANOVA's indicated support for these main effects, for Needs Satisfaction,  $F(1,73) = 243.62$ ,  $p = < .001$ , and Fundamental Needs (largest  $F$  was for belonging,  $F(1,73) = 238.12$ ,  $p < .001$ ). Therefore, consistent with previous research and in support of study predictions, being ostracised significantly lowers levels of Needs Satisfaction and Fundamental Needs, belonging, self-esteem, meaningful existence and control, compared to being included.

Interestingly, there was no main effect of source-gender on Needs Satisfaction  $F(1,73) = 1.88, p = .17$ , or Fundamental Needs; but only for three measures; belonging,  $F(1,73) = 2.49, p = .12$ ; meaningful existence,  $F(1,73) = .43, p = .51$ , or control,  $F(1,73) = .027, p = .87$ . Notably, a significant main effect of source-gender was indicated on measures for self-esteem,  $F(1,73) = 5.54, p = .02$ . Further inspection of means indicates participants ostracised by females reported greater threat to their self-esteem,  $M = 10.10, SD = 3.26$  than those ostracised by males,  $M = 11.05, SD = 3.42$ , and participants included by females reported an increase in their self-esteem,  $M = 22.35, SD = 2.88$ , compared to those included by males,  $M = 17.85, SD = 4.26$ . While a significant finding, this simple effect was not a prediction, as much as the way in which source-gender would interact with ostracism-condition to effect fundamental needs was expected (Hypothesis 3). Therefore, it is reported to illustrate possible nuances in measures of individual needs. A main effect of target gender-identity on Needs Satisfaction  $F(1,73) = 0.90, p = .345$ , or on Fundamental Needs (largest  $F$  was for self-esteem,  $F(1,73) = 3.3, p = .07$ ) was also not supported, however this was not expected.

**Table 3.** Descriptive statistics showing the means (SD) for Needs Satisfaction and Fundamental Needs by Source-Gender (Female vs. Male), Target Gender-Identity (Moderate GI vs. High GI), and Ostracism-Condition (Included vs. Ostracised).

	Source							
	Female				Male			
	Included		Ostracised		Included		Ostracised	
	Moderate GI	High GI	Moderate GI	High GI	Moderate GI	High GI	Moderate GI	High GI
	$N = 7$	$N = 13$	$N = 9$	$N = 11$	$N = 10$	$N = 11$	$N = 11$	$N = 9$
Needs Satisfaction <sup>a</sup>	16.88 (1.32)	17.55 (2.4)	7.62 (1.9)	5.32 (.61)	15.02 (2.17)	12.98 (3.82)	7.41 (1.24)	9.04 (3.18)
$F(1,73) = 243.62, p < .001$								
Fundamental needs <sup>c</sup>								
Belonging <sup>c</sup>	22.00 (2.31)	23.38 (3.82)	9.66 (3.87)	5.45 (.69)	19.30 (3.71)	17.00 (4.69)	8.82 (1.79)	10.55 (1.03)
$F(1,73) = 243.62, p < .001$								
Self-esteem	22.00 (2.31)	22.54 (3.23)	12.33 (3.53)	8.27 (1.42)	19.40 (3.3)	16.45 (4.69)	10.63 (2.01)	11.55 (4.72)
$F(1,73) = 155.32, p < .001$								
Meaningful existence	22.71 (1.71)	22.69 (2.21)	9.22 (2.53)	7.18 (2.13)	20.66 (3.43)	17.27 (6.12)	9.9 (1.92)	12.00 (4.30)
$F(1,73) = 214.94, p < .001$								
Control	17.57 (2.43)	19.15 (4.37)	6.88 (1.53)	5.72 (1.42)	15.80 (3.42)	14.18 (5.32)	7.72 (2.24)	11.11 (4.70)
$F(1,73) = 120.93, p < .01$								

<sup>a</sup> Needs Satisfaction score represents the composite score from 20 questions, 5 per individual need; rating 1-5 per item

<sup>b</sup> Each fundamental need score represents the sum of five questions rating 1 to 5 per item

<sup>c</sup> All  $F$  refer to significant ostracism vs. inclusion main effects

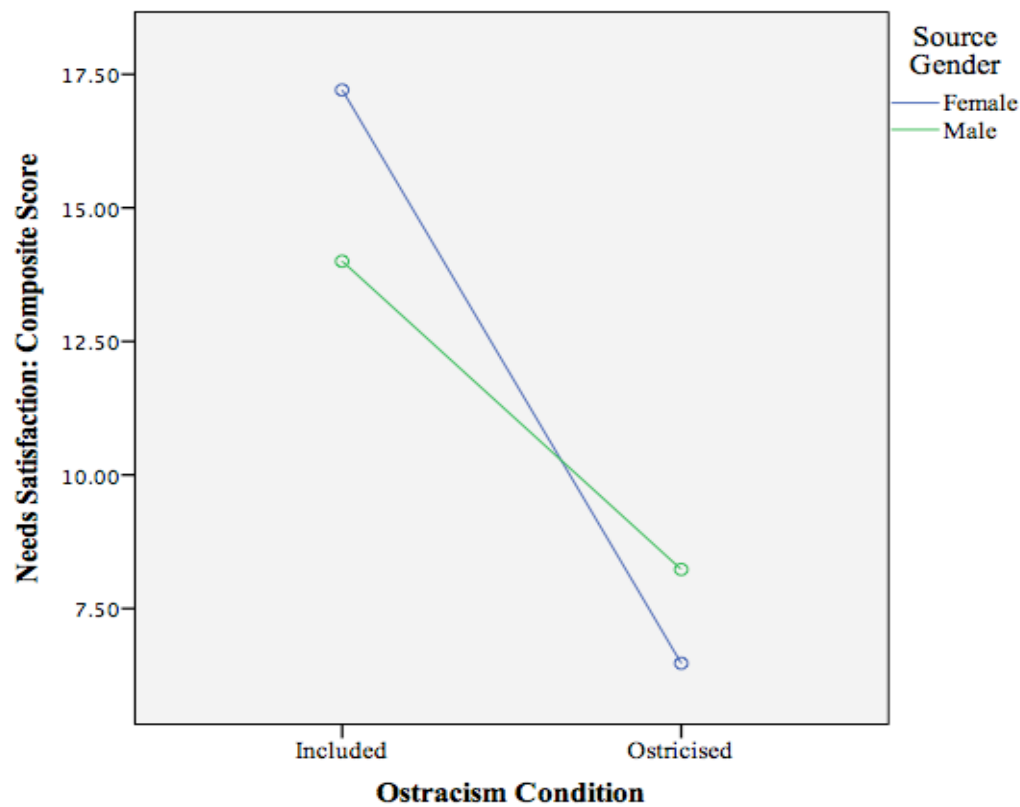
### Two-way Interactions of Main Effects

Hypothesis 3 predicted participants ostracised by in-group (females) would report the greatest threat to Needs Satisfaction and Fundamental Needs, belonging self-esteem, meaningful existence and control, compared to participants ostracised by out-group (males). Two-way ANOVA's were conducted which indicated a statistically significant interaction between the effects of ostracism-condition and source-gender on Needs Satisfaction,  $F(1, 73) = 22.02, p < .001$ , and Fundamental Needs (largest  $F$  was for belonging,  $F(1,73) = 19.73, p = <.001$ ). Follow up analysis using a t-test split by source-gender indicated participants ostracised by females reported lower levels of Need Satisfaction than participants ostracised by males  $t(38) = -2.69, p = .011$ . They also had

significantly lower Fundamental Needs, belonging  $t(38) = -2.22, p = .03$ ; self-esteem,  $t(38) = -.89, p < .001$ ; meaningful existence,  $t(38) = -2.98, p = .005$ , and control,  $t(38) = -3.22, p = .003$ . Additionally, results also indicate participants included by females reported increased levels of needs satisfaction than participants included by males,  $t(39) = 3.39, p < .001$ . They also had a significantly increased sense of belonging,  $t(39) = 3.96, p < .001$ ; self-esteem,  $t(39) = 3.93, p < .001$ ; meaningful existence,  $t(39) = 3.08, p = .004$ , and control,  $t(39) = 2.80, p = .008$ . Therefore, it is accepted, as predicted in hypothesis 3, that in-group ostracism would impact ostracism distress, such that being ostracised by in-group members will hurt more than being ostracised by out-group members.

### Three-way Interaction

Hypothesis 4 predicted participants ostracised by in-group (source-gender: females) would report lower levels of Needs Satisfaction and Fundamental Needs, moderated by the extent to which they identify (target gender-identity) with the in-group. To test for this prediction, a three-way ANOVA was conducted to examine the interaction effect of ostracism-condition\*source-gender\*target gender-identity on Needs Satisfaction and Fundamental Needs. There was a statistically significant three-way interaction for Needs Satisfaction,  $F(1,73) = 9.91, p = .002$ , and for Fundamental Needs, (largest  $F$  was for belonging,  $F(1,73) = 9.92, p = .002$ ). This was further analysed by conducting a two-way interaction between ostracism-condition and source-gender to assess how the interaction may vary across levels of the third variable defined as 'target gender-identity' (moderate vs. high). An interaction effect between ostracism-condition and source-gender was not supported for participants who only moderately identified with in-group; Needs Satisfaction,  $F(1, 38) = 2.03, p = .163$ , and Fundamental Needs, (largest  $F$  for meaningful existence,  $F(1, 38) = 2.74, p = .110$ ). However, a unique and very significant finding was revealed by the highly significant interaction between ostracism-condition and source-gender for participants with a strong identification with the in-group (target gender-identity: high) for Needs Satisfaction,  $F(1,40) = 24.51, p < .001$  (illustrated in figure 1), and Fundamental Needs, (largest  $F$  was for belonging,  $F(1,40) = 26.92, p < .001$ ).



**Figure 1:** Line graph for the interaction effect of ostracism-condition and gender-source on Needs Satisfaction for participants with a high gender-identity

Figure 1 illustrates the interaction effects of ostracism-condition and gender-source for participants with high gender-identity. Therefore, as predicted in Hypothesis 4, participants ostracised by in-group will have lower levels of Needs Satisfaction and Fundamental Needs, influenced by the extent to which they identify with the in-group (target gender-identity).



## DISCUSSION

The present study hypothesised ostracism is powerful enough to lower mood and threaten four fundamental needs, belonging, self-esteem, meaningful existence and control. An important point of difference was the prediction that in-group ostracism would impact target levels of needs satisfaction, further enhanced by the targets identification with the ostracism source. Additionally, by manipulating the in-group variable by gender, it was anticipated to be the first study to report the influencing effect of source-gender on ostracism-distress, measured in the reflexive stage.

**Mood:** Consistent with past research and study predictions, participants in the ostracism condition reported a significant decrease in mood from pre-test to post-test compared to participants in the inclusion condition, who reported significant increases in mood. This indicates ostracism affects mood, such that exclusion elicits feelings of sadness and anger contrasted with feelings of happiness and contentment, when included. Furthermore, items used and replicated from previous research are demonstrated to be sensitive enough to detect changes in mood levels (Ruggieri et al., 2013; Williams & Zadro, 2005; Williams, 2001, 2007).

**Need Satisfaction and Fundamental Needs:** Consistent with past research and study predictions, a main effect of ostracism-condition was supported, whereby participants in the ostracised condition reported reduced Needs Satisfaction (composite score) as well as reduced Fundamental Needs (as individual measures) compared to included participants who reported higher Needs Satisfaction and Fundamental Needs. This is an outcome replicated in almost all Cyberball-ostracism research, which asserts that independent of any other exploratory variables, ostracism, quite simply, feels worse than inclusion, and inclusion feels better than being ostracised (Williams et al., 2001, Williams & Zadro, 2005; Williams, 2007).

Most interestingly, the present study found ostracism-distress is most acute when perpetrated by fellow in-group (female) members, while social inclusion is experienced more positively when offered by in-group (female) relative to out-group (male) members. Significantly, these effects of ostracism and social inclusion by in-group condition were enhanced by a strong (but not moderate), identification with the ostracising source.

Several theoretical positions are congruent with the findings for the present study. First, group-based bonds are strengthened when meaningful characteristics are shared between group members (Tajfel, 1982); consequently, being ostracised by an in-group will be experienced more painfully than being ostracised by an out-group (Bernstein et al., 2010). However, differential responses in the literature indicates this effect only occurs for highly essentialised groups (race; Bernstein et al., 2010) and not for arbitrary groups with weak affiliations (Mac vs. PC users, Smith & Williams, 2004). The results herein appear to validate this inter-group perspective. By manipulating the source-in-group by the important social group 'gender', indicated an influencing in-group effect on ostracism-distress. Additionally, the extent to which the participant self-identified with the in-group enhanced ostracism-distress, ultimately providing compelling evidence that the meaningfulness of an in-group increases target vulnerability to ostracism-distress; more so than arbitrary groups.

While a positive contribution, a research lacuna indicates a temporal model may actually explain the results in the present study. Such that, the participants' 'increased distress'

represents deliberation in the reflective stage, rather than any particular inter-group phenomena experienced in the immediate, reflexive stage (Williams et al., 2001). However, by manipulating the in-group variable to include an important social group, and then measuring levels of fundamental needs in the reflexive stage (and not reflective stage; see Bernstein et al., 2010), the results herein offer a unique contribution to the literature. Indeed, to date, it may be the first to indicate as much. Accordingly, it is proposed a more contextualised and nuanced picture of ostracism response has emerged to supersede the “*all or nothing*” (Sacco et al., 2014, p. 135) temporal assertions of earlier work (e.g., Williams et al., 2001; Smith & Williams, 2004). That is, participants ostracised while playing Cyberball with members of a meaningful in-group, seemingly begin to experience threat to their fundamental needs, as a function of in-group-out-group distinctions, much sooner than the 3-4 minutes *after* the episode; as is proposed by Williams and colleagues (2001). This is especially noteworthy in light of the time the participants are estimated to have to *reflect* upon being ostracised while playing Cyberball. It is estimated approximately two and half minutes passes between the last included ball toss and beginning the needs threat measure. It is therefore reasonable to assume the participant is likely to be making cognitive appraisals of the other players (being female or male) in that time, and not only in the 3-4 minutes after (reflective stage). While it was not the present author’s intention to challenge the utility of the Cyberball-paradigm, and the corroborating Temporal Needs Threat Model (particularly as they are well-regarded, and have made important contributions to social psychology), the results here raise doubts for the prudence in accepting a strict interpretation of the temporal model for early stage ostracism response. Future research may benefit from using the present experimental design in a between-subjects comparison of time (reflexive vs. reflective), to further explore differences in response.

In addition, very few studies have examined reactions to in-group ostracism as a response influenced by gender, indeed; extant literature indicates it has been largely ignored. What’s more, studies that have acknowledged gender as a variable have done so to explore an alternate hypothesis (gender differences in task behaviours after ostracism, Williams & Sommer, 1997), or have introduced gender as a cross-cutting variable such that results cannot be truly isolated to gender (Abrams et al., 2011). Subsequently, the present study’s deliberate focus on gender is believed to be the first. Indeed, by controlling samples (equal numbers across groups), as well as adopting a stringent procedure aimed at activating gender salience over other possible extraneous variables, the results are considered not only robust, but appear to align best with existing gender research (Eagly & Chvrvala, 1986; Eagly, Wood, & Diekmann, 2000). Based on the theory of gender social roles, which asserts females as nurturing and caring, with communal qualities motivating them towards intimate and close relationships (Eagly & Chvrvala, 1986), it is quite surprising Cyberball-ostracism research has not already used the present study’s experimental design. After all, it seems sensible to assume females ostracised by other females would experience greater threat to their fundamental needs than if ostracised by males. Not just because of group membership theories, but because ostracising behaviour by females would breach expectations informed by these gender role stereotypes, a prediction made and supported in the present study.

Finally, while the simple main effect of source-gender was not supported for Needs Satisfaction, or for three Fundamental Needs, belonging, meaningful existence or control; a main effect was found for the independent measure of self-esteem. This was another unique finding, whereby females in this study reported greater threat to their

self-esteem when ostracised by other females than if ostracised by males, conversely, females included by other females reported increases in their self-esteem compared to those included by males. While only across one need measure, it does support the possible merit of evaluating individual fundamental needs separately, such that using a composite score does not miss possible nuanced responses.

### **Limitations and Suggestions for Future Research**

Despite, the seemingly unique findings in the present study, nonetheless they are interpreted with caution due to two rather considerable confounds; method of analysis and assumptions of gender salience

First, it must be acknowledged that using several ANOVA's to explore the influencing effect of source-gender on ostracism-distress, and a possible interaction of target gender-identity, was not the best approach for illustrating a true moderating effect. Indeed, based on the theoretical position of Kenny (2015) a moderated-moderation analysis would have been more appropriate. That is, ostracism condition (X) would have a causal relationship with threatened needs (Y) moderated by source gender (M) as a *simple effect* of X on Y. Then the relationship between source gender (M) and threatened needs (Y) would be moderated by the introduction of gender identity (MM), such that source gender (female) ostracism effect is moderated by the extent to which the participant identifies with being a woman. Unfortunately, the complexity of conducting such an analysis was beyond the capabilities of the present author, therefore future research may benefit from this advanced form of analysis.

In another rather frustrating limitation, the skewed distributions for ostracism-condition made conducting an ANCOVA to explore moderating effects, impossible. Therefore, resolving to use ANOVA's, and the subsequent conversion of gender-identity from a continuous to categorical variable using a medium split, has likely reduced the power of the results to the extent that they are far from conclusive. What's more, the study sample was shown to be generally quite high for self-reports of female gender-identity, resulting in a rather weak moderate vs. high dichotomy. It could be argued the sample was overly represented by participants who mostly believed being a woman was an important part of their self-identity. Therefore, the results here may fail to truly exemplify the impact of gender-identity on ostracism-distress, when ostracism is perpetrated by a female towards another female (the main covenant underpinning Hypothesis 4). One explanation for the generally 'high' reports of female gender-identity could be the sample of psychology undergraduates who engage frequently with gendered issues explored in social psychology. Their likely understanding of the possible prejudices experienced by females as a function of unequal social power, may motivate defensive responses resulting in overly positive appraisals of women to enhance their own identity as a woman, and influence the importance therein (Eagly & Karua, 2002). Future research may benefit from a more representative community sample in order to better generalise these findings.

Finally, while it is contended the salience of gender was activated over any other extraneous variable, and that prevailing results are indicative of the inter-group phenomena of gender, it remains unclear whether current effects are due to an in-group effect or due to differences in power status among the in-group (females) and out-group (males). For example, Bernstein and colleagues (2010) found both Black and White participants reported corresponding effects when ostracised by racial in-group and out-

group members. It is a rather perplexing outcome, in so far as it does not align with the status or power interpretation of race (Sacco et al., 2014). It is a similar conundrum facing the present study, whereby the low status of females compared to the higher status of males could be a latent variable moderating the effect of ostracism. Subsequently, future research could explore differences in levels of fundamental needs as a response to in-group ostracism in a between-subjects comparison between males and females.

## **CONCLUSION**

Using the well-known experimental 'Cyberball-paradigm' to isolate the effects of ostracism, the present study has been able to demonstrate that exclusion can be a powerful tactic to alter a person's mood and reduce overall feelings of belonging, self-esteem, meaningful existence, and control. Importantly, this effect is sensitive to the moderating effects of a meaningful in-group status, specifically 'gender', when measured in the reflexive stage. While considered a unique outcome, limitations discussed indicate the effect may not be especially robust; subsequent research would benefit from an alternate sample and method of analysis. Additionally, a better understanding of other possible supplementary mechanisms responsible for the differential responses to ostracism by in-group members would be beneficial, particularly in relation to male responses, as well as the timing for conducting measures.

## REFERENCES

- Anderson, S. (2015). Recovery from Ostracism. Retrieved from; <http://ostracism-awareness.com/recovery/>
- Aydin, N., Fisher, P., & Frey, D. (2010). Turning to God in the face of Ostracism: Effects of Social Exclusion on Religiousness. *Personality and Social Psychology Bulletin*, 36, 742-753.
- Baumeister, R., F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, 117, 497-529.
- Bernstein, M. J., Sacco, D. F., Young, S. G., Hugenberg, K. & Cook, E. (2010). Being "in" with the in-crowd: The effects of social exclusion and inclusion are enhanced by the perceived essentialism of the in-group and out-group. *Personality and Social Psychology Bulletin*, 36, 999-1009
- Blakemore, J. E. O., Berenbaum, S. A., & Liben, L. S. (2012). Gender Development. Psychology Press. Hove, East Sussex: UK.
- Correl, J., & Park, B. (2005). A model of the in-group as a social resource. *Personality and Social Psychology Review*, 9, 341-359
- Eagly, A. H., & Chivala, C. (1986). Sex differences in Conformity: Status and Gender Role Interpretations. *Psychology of Women Quarterly*, 10, 203-220
- Eagly A. H., & Karua. S. (2002). Role Congruity Theory of Prejudice Toward Female Leaders. *Psychology Review*, 3, 579-598
- Eagly, A. H., Wood, W., & Diekmann, A. B. (2000). Social role theory of sex differences and similarities: A current appraisal. *The developmental social psychology of gender (pp.123-174)*.
- Eagly, A. H., & Steffen, V. J. (1984). Gender stereotypes stem from the distribution of women and men into social roles. *Journal of Personality and Social Psychology*, 46, 735.
- Eisenberger, N. I., Lieberman, M. D., & Williams, K. D. (2003). Does rejection hurt? An fMRI study of social exclusion. *Science*, 302, 290-292.
- Gonsalkorale, K., & Williams, D (2007). The KKK wont let me play: Ostracism even by a despised out-group hurts. *European Journal of Social Psychology*, 37, 1176 - 1186
- Gruter, M., & Masters, R., (1986). Ostracism as a social and biological phenomenon: An introduction. *Ethology and Sociobiology*, 7, 149-158
- Jarvis, W. B. G. (2000). MediaLab (V. 2004) [Computer Software]. Columbus, OH: Empirisoft
- Kassner, M. P., Wesselmann, W. D., & Williams, K. D. (2012). Virtually ostracised: studying ostracism in immersive virtual environments. *Cyberpsychology Behaviour Society Network*, 15, 399-403
- Kenny, D. A. (2015). Moderated Variables. Retrieved from: <http://davidakenny.net/cm/moderation.htm>
- Leary, M. R., Kowalski, R. M., Smith, L., & Phillips, S. (2003). Teasing, Social Rejection, and Violence: Case Studies of School Shootings. *Aggressive Behaviour*, 29, 202-214.
- Leary, M. (2005) Why does Ostracism hurt? The relationship between social and physical pain. *Psychology Bulletin*, 2, 202-223
- Luhtanen, R., Crocker, J. (1992). A Collective Self-Sesteem Scale: Self-Evaluation of Ones Own Social Identity. *Personality and Social Psychology Bulletin*, 18, 302-308

- Ruggieri, S., Bendixen, M., Gabriel, U., & Alsaker, F. (2013). Cyberball. The impact of Ostracism on the Well-Being of Early Adolescents.
- Smith, A., & Williams, K. D. (2004). R U There? Effects of ostracism by cell phone messages. *Group Dynamics: Theory, Research, and Practice*, 8, 291-301
- Schmader, T. (2002). Gender identification moderates stereotype threat effects on women's math performance. *Journal of Experimental Psychology*, 38, 194-201
- Tajfel, H. (1982). Social psychology of intergroup relations, *Annual Review of Psychology*, 33, 1-39.
- Tajfel, H., & Turner, J. C. (1986). The social identity theory of intergroup behaviour. *Psychology of Intergroup Relations*, 2, 7-24
- Twenge, J. M., Baumeister, R. F., Tice, D. M., & Stucke, T. S., (2005). If you can't beat them, join them, beat them: Effects of social exclusion on aggressive behaviour. *Journal of Personality and Social Psychology*, 81, 1058-1069.
- van Beest, I., & Williams, K. D. (2006). When inclusion costs and ostracism pays, ostracism still hurts. *Journal and Social Psychology*, 91, 918-928.
- Walther, J. B. (1992). Theories of Computer-mediated Communication and Interpersonal Relations. Retrieved from: [http://www.sagepub.com/upm-data/42241\\_14.pdf](http://www.sagepub.com/upm-data/42241_14.pdf)
- Warburton, W., Williams, K. D., & Cairns, D. (2006). When ostracism leads to aggression: The moderating effects of control deprivation. *Journal of Experimental Psychology*, 42, 213-220.
- Waters, J. A., Lynn, R. I., & Morgan, K. J. (2002). Workplace Violence: Prevention and Intervention, Theory and Practice. *Handbook of Violence*, 17, 378-385.
- Williams, K. D. (1997). Social Ostracism, In R. Kowalski (Ed.), *Aversive interpersonal behaviours* (pp. 133-170). New York, NY: Plenum Press.
- Williams, K. D., & Sommer, K. L. (1997). Social ostracism by co-workers: Does rejection lead to loafing or compensation? *Personality and Social Psychology Bulletin*, 23, 693-706.
- Williams, K. D. (2001). *Ostracism: The power of silence*. New York, NY: Guilford Press
- Williams, K. D. (2007). Ostracism. *Annual Review of Psychology*, 58, 425-452.
- Williams, K. D., Cheung, C. K. T., & Choi, W. (2000). Cyberostracism: Effects of being ignored over the Internet. *Journal of Personality and Social Psychology*, 79, 748-762.
- Williams, K. D., & Zadro, L. (2005). Ostracism: An indiscriminate early detection system. In K. D. Williams, J. P. Forgas, & W. von Hippel (Eds.). *The social outcast: Ostracism, social exclusion, rejection and bullying*, (pp. 19-34). New York, NY: Psychology Press.
- Williams, K. D., & Jarvis, B. (2006). Cyberball. A program for use in research on interpersonal ostracism and acceptance. *Behaviour Research Methods*, 38, 174-180
- Williams, K. D. (2009). Ostracism: A temporal need-threat model. *Advances in Experimental Social Psychology*, 41, 275-314.
- Young, K., & Nebuco de Abreu, C. (2010). *Internet Addiction: A Handbook and Guide to Evaluation and Treatment*. Hamilton. Castleton. N.Y
- Zadro, L., Boland, C., & Richardson, R. (2006). How long does it last? The persistence of the effects of ostracism in the socially anxious. *Journal of Experimental Social Psychology*, 42, 692-697.
- Zwolinski, J. (2014). Does Inclusion After Ostracism Influence the Persistence of Affective Distress? *Group Dynamics: Theory, Research, and Practice*. Advance online publication. <http://dx.doi.org/10.1037/gdn0000012>

